

REMARKS

Claims 1, 14, and 24 have been amended. Claims 1 through 24 remain in the application.

In the Office Action made Final, claims 1 through 13 were rejected under 35 U.S.C. § 112, first paragraph, as containing subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. Applicants respectfully traverse this rejection.

The first paragraph of Section 112 provides that “the specification shall contain a written description of the invention . . .”. “The description requirement’s purposes are to assure that the applicant was in full possession of the claimed subject matter on the application filing date and to allow other inventors to develop and obtain patent protection for later improvements and subservient inventions that build on applicant’s teachings.” See In re Barker, 559 F.2d 588, 194 U.S.P.Q. 470 (C.C.P.A. 1977), cert. denied, 434 U.S. 1064 (1978); Vas-Cath Inc. v. Mahurkar, 935 F.2d 1555, 19 U.S.P.Q.2d 1111 (Fed. Cir. 1991); and In re Dossel, 115 F.2d 942, 42 U.S.P.Q.2d 1881 (Fed. Cir. 1997).

Thus, the dispositive issue is whether Applicants’ disclosure in the patent application relied upon “reasonably conveys to the artisan that the inventor had possession at the time of the later claimed subject matter”. The threshold step in resolving this issue as set forth supra is to determine whether the Examiner has met his burden of proof by advancing acceptable reasoning inconsistent with the written description. This the Examiner has not done.

Although Applicants disagree with the Examiner, claim 1 has been amended to change “multi-stage” to “two-stage”. Based on the above, Applicants’ disclosure reasonably

conveys to the artisan that the inventor had possession at the time of the later claimed subject matter. Therefore, it is respectfully submitted that claims 1 through 13 are allowable over the rejection under 35 U.S.C. § 112, first paragraph.

In the Office Action made Final, claims 1 through 13 were rejected under 35 U.S.C. § 102(b) as being anticipated by Marando et al. (U.S. Patent No. 6,016,603).

Applicants respectfully traverse this rejection.

U.S. Patent No. 6,016,603 to Marando et al. discloses a method of hydroforming a vehicle frame component. FIGS. 3 and 4 show a tube 10 after the completion of a preliminary hydroforming operation. The hydroforming operation uses pressurized fluid to deform and expand the tube 10 into conformance with the die cavity of a first hydroforming die 11. To accomplish this, the tube 10 is filled with a pressurized fluid, typically a relatively incompressible liquid such as water. The pressure of the fluid is increased to a magnitude where the tube 10 is deformed outwardly into conformance with the die cavity. As a result, the tube 10 is deformed into the shape illustrated in FIGS. 3 and 4. Any conventional apparatus may be used to perform the preliminary hydroforming operation. FIG. 5 illustrates the preliminarily expanded tube 10 disposed within a second hydroforming die, indicated generally at 15, that is composed of a first die section 16 and a second die section 17. As with the first hydroforming die 11, the die sections 16 and 17 have respective cavity portions 16a and 17a formed therein that cooperate to form a hydroforming die cavity when the die sections 16 and 17 are moved into engagement with one another. In FIG. 5, the die sections 16 and 17 are shown in the process of being moved toward one another, as shown by the respective arrows. Thus, only the opposed upper and lower portions of the expanded tube 10 are shown as being engaged by the die sections 16 and 17. The inner

surface of the die cavity of the second hydroforming die 15 preferably corresponds in cross sectional shape to the desired final shape for the tube 10. Marando et al. does not disclose a method of progressive hydro-forming of a tubular member in a two-stage die by positioning a tubular member between open die halves mating with one another to define a first tubular cavity portion in a first stage of the two-stage die, applying hydraulic pressure to expand and conform the tubular member to the first tubular cavity portion in the first stage to create pre-expanded portions in the tubular member, positioning the expanded tubular member between open die halves mating with one another to define a second tubular cavity portion in a second stage of the two-stage die, and applying hydraulic pressure to expand and conform the expanded tubular member to the second tubular cavity portion in the second stage to ovalize the pre-expanded portions and to create ribs between a first section and a bend section of the expanded tubular member.

In contradistinction, claim 1, as amended, clarifies the invention claimed as a method of progressive hydro-forming of a tubular member in a two-stage die. The method includes the steps of providing a tubular member and positioning the tubular member between open die halves mating with one another to define a first tubular cavity portion in a first stage of the two-stage die. The method also includes the steps of progressively closing the die halves to progressively deform the tubular member within the first tubular cavity portion and applying hydraulic pressure to expand and conform the tubular member to the first tubular cavity portion in the first stage to create pre-expanded portions in the tubular member. The method includes the steps of separating the die halves, removing the expanded tubular member from the first tubular cavity portion, and positioning the expanded tubular member between open die halves mating with one another to define a second tubular cavity portion in a second stage of the two-stage die.

The method further includes the steps of progressively closing the die halves to progressively deform the expanded tubular member within the second tubular cavity portion and applying hydraulic pressure to expand and conform the expanded tubular member to the second tubular cavity portion in the second stage to ovalize the pre-expanded portions and to create ribs between a first section and a bend section of the expanded tubular member. The method includes the steps of separating the die halves and removing the final expanded tubular member from the second tubular cavity portion.

A rejection grounded on anticipation under 35 U.S.C. § 102 is proper only where the subject matter claimed is identically disclosed or described in a reference. In other words, anticipation requires the presence of a single prior art reference which discloses each and every element of the claimed invention arranged as in the claim. *In re Arkley*, 455 F.2d 586, 172 U.S.P.Q. 524 (C.C.P.A. 1972); *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 218 U.S.P.Q. 781 (Fed. Cir. 1983); *Lindemann Maschinenfabrik GMBH v. American Hoist & Derrick Co.*, 730 F.2d 1452, 221 U.S.P.Q. 481 (Fed. Cir. 1984).

Marando et al. '603 does not disclose or anticipate the present invention of claim 1. Specifically, Marando et al. '603 merely discloses a method of hydroforming a vehicle frame component in which a hydroforming operation uses pressurized fluid to deform and expand a tube into conformance with a die cavity of a first hydroforming die and the preliminarily expanded tube is disposed within a second hydroforming die for a second hydroforming operation. Marando et al. '603 lacks a method of progressive hydro-forming of a tubular member in a two-stage die by positioning a tubular member between open die halves mating with one another to define a first tubular cavity portion in a first stage of the two-stage die, applying hydraulic pressure to expand and conform the tubular member to the

first tubular cavity portion in the first stage to create pre-expanded portions in the tubular member, positioning the expanded tubular member between open die halves mating with one another to define a second tubular cavity portion in a second stage of the two-stage die, and applying hydraulic pressure to expand and conform the expanded tubular member to the second tubular cavity portion in the second stage to ovalize the pre-expanded portions and to create ribs between a first section and a bend section of the expanded tubular member. In Marando et al. '603, the hydroforming operation uses pressurized fluid to deform and expand the tube 10 into conformance with the die cavity of a first hydroforming die 11 and the preliminarily expanded tube 10 is disposed within a second hydroforming die 15 for a second hydroforming operation, and there is no single two-stage die for progressive hydro-forming of a tubular member or ovalizing pre-expanded portions of the expanded tubular member and creating ribs between a first section and a bend section of the expanded tubular member. The Examiner admits on page 4 of the Office Action that Marando et al. '603 does not disclose the cavities being in the same two-stage die.

Marando et al. '603 fails to disclose the combination of a method of progressive hydro-forming of a tubular member in a two-stage die including the steps of providing a tubular member, positioning the tubular member between open die halves mating with one another to define a first tubular cavity portion in a first stage of the two-stage die, progressively closing the die halves to progressively deform the tubular member within the first tubular cavity portion, applying hydraulic pressure to expand and conform the tubular member to the first tubular cavity portion in the first stage to create pre-expanded portions in the tubular member, separating the die halves, removing the expanded tubular member from the first tubular cavity portion, positioning the expanded tubular member between open die

halves mating with one another to define a second tubular cavity portion in a second stage of the two-stage die, progressively closing the die halves to progressively deform the expanded tubular member within the second tubular cavity portion, applying hydraulic pressure to expand and conform the expanded tubular member to the second tubular cavity portion in the second stage to ovalize the pre-expanded portions and to create ribs between a first section and a bend section of the expanded tubular member, separating the die halves, and removing the final expanded tubular member from the second tubular cavity portion as claimed by Applicants. Therefore, it is respectfully submitted that claim 1 and the claims dependent therefrom are allowable over the rejection under 35 U.S.C. § 102(b).

In the Office Action made Final, claims 14 through 24 were rejected under 35 U.S.C. § 103 as being unpatentable over Marando et al. '603 in view of Metcalf (U.S. Patent No. 1,899,288). Applicant respectfully traverses this rejection.

U.S. Patent No. 1,899,288 to Metcalf discloses a means for forming forked heads on metal bars. The first step in the method is to suitably heat a bar 30, or the end of it to be worked, to a suitable forging temperature. Then the heated bar is positioned upon the stationary die of the forging machine in die impression 21, a portion 27 of which is of the same dimension as the bar, and the movable die is brought into bearing contact with the stationary die. The upsetting plunger 24, whose head 28 is of the same shape and dimension as the working portion 29 of the die impression 21, is then forced lengthwise into the working portion of the die impression 21 and exerts an endwise pressure upon the heated metal bar, which is firmly held in the die in desired position; and the bar 30 is thus spread or upset to make it conform to the working portion 29 of the die impression 21 and to form an upset end 31 on the bar 30. The upset end 31 having been formed, the bar 30 is removed

from the die impression 21, and if the upset end of the bar 30 is still at a forging heat it is then disposed in die impression 22. Metcalf does not disclose applying at least nominal internal hydraulic pressure to the tubular member, progressively closing the die halves to progressively deform the tubular member within the first tubular cavity portion, increasing the hydraulic pressure to expand and conform the tubular member to the first tubular cavity portion in the first stage to create pre-expanded portions in the tubular member, progressively closing the die halves to progressively deform the expanded tubular member within the second tubular cavity portion, and increasing the hydraulic pressure to expand and conform the expanded tubular member to the second tubular cavity portion in the second stage to ovalize the pre-expanded portions and to create ribs between a first section and a bend section of the expanded tubular member.

In contradistinction, claim 14 claims the present invention as a method of progressive hydro-forming of a tubular member in a two-stage die. The method includes the steps of providing a metal tubular member and positioning the tubular member between open die halves mating with one another to define a first tubular cavity portion in a first stage of the two-stage die. The method also includes the steps of applying at least nominal internal hydraulic pressure to the tubular member and progressively closing the die halves to progressively deform the tubular member within the first tubular cavity portion to create pre-expanded portions in the tubular member. The method further includes the steps of increasing the hydraulic pressure to expand and conform the tubular member to the first tubular cavity portion in the first stage, separating the die halves, and removing the expanded tubular member from the first tubular cavity portion. The method includes positioning the expanded tubular member between open die halves mating with one another to define a second tubular cavity portion in a second stage of the

two-stage die and progressively closing the die halves to progressively deform the expanded tubular member within the second tubular cavity portion. The method also includes the steps of increasing the hydraulic pressure to expand and conform the expanded tubular member to the second tubular cavity portion in the second stage to ovalize the pre-expanded portions and to create ribs between a first section and a bend section of the expanded tubular member, separating the die halves, and removing the final expanded tubular member from the second tubular cavity portion. Claim 24 is similar to claim 14 and includes other features of the present invention.

The United States Court of Appeals for the Federal Circuit (CAFC) has stated in determining the propriety of a rejection under 35 U.S.C. § 103, it is well settled that the obviousness of an invention cannot be established by combining the teachings of the prior art absent some teaching, suggestion or incentive supporting the combination. See In re Fine, 837 F.2d 1071, 5 U.S.P.Q.2d 1596 (Fed. Cir. 1988); Ashland Oil, Inc. v. Delta Resins & Refractories, Inc., 776 F.2d 281, 227 U.S.P.Q. 657 (Fed. Cir. 1985); ACS Hospital Systems, Inc. v. Montefiore Hospital, 732 F.2d 1572, 221 U.S.P.Q. 929 (Fed. Cir. 1984). The law followed by our court of review and the Board of Patent Appeals and Interferences is that “[a] prima facie case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art.” In re Rinehart, 531 F.2d 1048, 1051, 189 U.S.P.Q. 143, 147 (C.C.P.A. 1976). See also In re Lalu, 747 F.2d 703, 705, 223 U.S.P.Q. 1257, 1258 (Fed. Cir. 1984) (“In determining whether a case of prima facie obviousness exists, it is necessary to ascertain whether the prior art teachings would appear to be sufficient to one of ordinary skill in the art to suggest making the claimed substitution or other modification.”)

None of the references cited, either alone or in combination with each other, teaches or suggests the claimed invention of claims 14 through 24. Specifically, Marando et al. '603 merely discloses a method of hydroforming a vehicle frame component in which a hydroforming operation uses pressurized fluid to deform and expand a tube into conformance with a die cavity of a first hydroforming die and the preliminarily expanded tube is disposed within a second hydroforming die for a second hydroforming operation. Marando et al. '603 lacks a method of progressive hydro-forming of a tubular member in a two-stage die by positioning a tubular member between open die halves mating with one another to define a first tubular cavity portion in a first stage of the two-stage die, applying hydraulic pressure to expand and conform the tubular member to the first tubular cavity portion in the first stage to create pre-expanded portions in the tubular member, positioning the expanded tubular member between open die halves mating with one another to define a second tubular cavity portion in a second stage of the two-stage die, and applying hydraulic pressure to expand and conform the expanded tubular member to the second tubular cavity portion in the second stage to ovalize the pre-expanded portions and to create ribs between a first section and a bend section of the expanded tubular member. In Marando et al. '603, the hydroforming operation uses pressurized fluid to deform and expand the tube 10 into conformance with the die cavity of a first hydroforming die 11 and the preliminarily expanded tube 10 is disposed within a second hydroforming die 15 for a second hydroforming operation, and there is no single two-stage die for progressive hydro-forming of a tubular member or ovalizing pre-expanded portions of the expanded tubular member and creating ribs between a first section and a bend section of the expanded tubular member.

Metcalf '288 merely discloses a means for forming forked heads on metal bars. Metcalf '288 lacks applying at least nominal internal hydraulic pressure to the tubular member, progressively closing the die halves to progressively deform the tubular member within the first tubular cavity portion, increasing the hydraulic pressure to expand and conform the tubular member to the first tubular cavity portion in the first stage to create pre-expanded portions in the tubular member, progressively closing the die halves to progressively deform the expanded tubular member within the second tubular cavity portion, and increasing the hydraulic pressure to expand and conform the expanded tubular member to the second tubular cavity portion in the second stage to ovalize the pre-expanded portions and to create ribs between a first section and a bend section of the expanded tubular member. In Metcalf '288, the method uses a multi-stage die, but there is no hydraulic pressure or progressive closing of the die halves to ovalize the pre-expanded portions and to create ribs between a first section and a bend section of an expanded tubular member. As such, there is no motivation or suggestion for combining Marando et al. '603 and Metcalf '288 together.

The present invention sets forth a unique and non-obvious combination of a method of progressive hydro-forming of a tubular member that can produce an integral one-piece part, thereby eliminating several pieces of deep drawn stampings that are brazed together. The references, if combinable, fail to teach or suggest the combination of a method of progressive hydro-forming of a tubular member in a two-stage die including the steps of providing a metal tubular member, positioning the tubular member between open die halves mating with one another to define a first tubular cavity portion in a first stage of the two-stage die, applying at least nominal internal hydraulic pressure to the tubular member, progressively closing the die halves to progressively deform the tubular member within the

first tubular cavity portion, increasing the hydraulic pressure to expand and conform the tubular member to the first tubular cavity portion in the first stage to create pre-expanded portions in the tubular member, separating the die halves, removing the expanded tubular member from the first tubular cavity portion, positioning the expanded tubular member between open die halves mating with one another to define a second tubular cavity portion in a second stage of the two-stage die, progressively closing the die halves to progressively deform the expanded tubular member within the second tubular cavity portion, increasing the hydraulic pressure to expand and conform the expanded tubular member to the second tubular cavity portion in the second stage to ovalize the pre-expanded portions and to create ribs between a first section and a bend section of the expanded tubular member, separating the die halves, and removing the final expanded tubular member from the second tubular cavity portion as claimed by Applicants.


Further, the CAFC has held that “[t]he mere fact that prior art could be so modified would not have made the modification obvious unless the prior art suggested the desirability of the modification”. In re Gordon, 733 F.2d 900, 902, 221 U.S.P.Q. 1125, 1127 (Fed. Cir. 1984). The Examiner has failed to show how the prior art suggested the desirability of modification to achieve Applicants’ invention. Thus, the Examiner has failed to establish a case of prima facie obviousness. Therefore, it is respectfully submitted that claims 14 through 24 are allowable over the rejection under 35 U.S.C. § 103.

Obviousness under § 103 is a legal conclusion based on factual evidence (In re Fine, 837 F.2d 1071, 1073, 5 U.S.P.Q.2d 1596, 1598 (Fed. Cir. 1988), and the subjective opinion of the Examiner as to what is or is not obvious, without evidence in support thereof, does not suffice. Since the Examiner has not provided a sufficient factual basis, which is supportive of

his/her position (see In re Warner, 379 F.2d 1011, 1017, 154 U.S.P.Q. 173, 178 (C.C.P.A. 1967),
cert. denied, 389 U.S. 1057 (1968)), the rejection of claims 14 through 24 is improper.
 Therefore, it is respectfully submitted that claims 14 through 24 are allowable over the rejection
 under 35 U.S.C. § 103.

Based on the above, it is respectfully submitted that the claims are in a condition
 for allowance, which allowance is solicited.

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